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Amol Khare

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EXAMINER

CHEN, SHIN HON

ART UNIT

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/820,980	<b>Applicant(s)</b> KHARE ET AL.	
	<b>Examiner</b> SHIN-HON CHEN	<b>Art Unit</b> 2431	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

1. Claims 1-36 have been examined.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Talpade et al. U.S. Pub. No. 20040148520 (hereinafter Talpade) in view of Fan et al. U.S. Pat. No. 6219706 (hereinafter Fan).

4. As per claim 1, Talpade discloses a method of preventing an attack on a network, the method comprising the computer-implemented steps of:

receiving an ICMP packet, wherein the ICMP packet carries a value associated with a connection in a connection-oriented transport protocol that identifies a transport protocol segment that caused a node to identify an error and to generate the ICMP packet in response to the error (Talpade: [0020] lines 4-5 and lines 13-15: analyze packet header for packet filtering for ICMP packet based on range of valid values of various packet header fields);

and responding to the ICMP packet by updating a parameter associated with the transport protocol connection only if the packet filed value is determined to be valid (Talpade: [0017] lines

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27-30: forwarding traffic/updating parameter associated with protocol connection if packet is not DDoS packet/the packet value is valid).

Talpade does not explicitly disclose wherein the portion of the header carries a packet sequence value associated with the connection; obtaining a packet sequence value from the header; determining if the packet sequence value is valid; and responding to the ICMP packet by updating a parameter value associated with the transport protocol connection only if the packet sequence value is determined to be valid.

However, Fan discloses filtering packets based on the sequence number presented in the header portion of a packet and update the current session state if sequence value is valid (Fan: column 10 lines 27-51: using packet values to filter DoS packets). It would have been obvious to one having ordinary skill in the art to utilize the sequence number contained in the connection-oriented packet into the field value of the ICMP packet because they are analogous art used to control DoS attack. Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant's invention to combine the teachings of Fan within the system of Talpade because it allows packet filter to analyze invalid range of value presented in header for filtering purposes.

5. As per claim 2, Talpade as modified discloses the method of claim 1. Talpade as modified further discloses wherein the ICMP carries a portion of a TCP header associated with a TCP connection (Fan: column 10 lines 27-51). Same rationale applies here as above in rejecting claim 1.

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6. As per claim 3, Talpade as modified discloses the method of claim 1. Talpade as modified further discloses wherein the step of receiving an ICMP packet comprises receiving an ICMP "endpoint unreachable" error packet (Talpade: [0006]: error packets in denial of service attack).

7. As per claim 4, Talpade as modified discloses the method of claim 1. Talpade as modified further discloses wherein the step of receiving an ICMP packet comprises receiving an ICMP packet that specifies that fragmentation is needed (Talpade: [0020] lines 4-6: ICMP messages).

8. As per claim 5, Talpade as modified discloses the method of claim 1. Talpade as modified further discloses wherein the step of authenticating the ICMP packet by determining if the packet sequence value is valid comprises determining if the packet sequence value is within a range of packet sequence values that are allowed by the transport protocol for the connection (Fan: column 10 lines 27-51).

9. As per claim 6, Talpade as modified discloses the method of claim 1. Talpade as modified further discloses wherein the step of authenticating the ICMP packet by determining if the packet sequence value is valid comprises determining if the packet sequence value is within a range of sent but unacknowledged TCP packet sequence values for the connection (Fan: column 10 lines 27-51).

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10. As per claim 7, Talpade as modified discloses the method of claim 1. Talpade as modified further discloses wherein the step of authenticating the ICMP packet by determining if the packet sequence value is valid comprises determining if the packet sequence value is exactly equal to one or more sequence values of one or more packets that are then-currently stored in a TCP re-transmission buffer, starting at a sequence value of a previously sent segment that resulted in receiving the ICMP packet (Fan: column 10 lines 35-41).

11. As per claim 8, Talpade as modified discloses the method of claim 1. Talpade as modified further discloses wherein the steps are performed in a router acting as a TCP endpoint node (Talpade: [0020]: sensor/firewall).

12. As per claim 9, Talpade as modified discloses the method of claim 1. Talpade as modified further discloses wherein the steps are performed in a firewall device (Talpade: [0020]: packet filtering device/firewall; Fan: column 10 lines 27-51: firewall/packet filter).

13. As per claim 10, Talpade discloses a method of preventing an attack on a network, the method comprising the computer-implemented steps of:

receiving, at a TCP endpoint node in a TCP/IP packet-switched network (Talpade: [0020] line 1-5: monitor all traffic entering customer network that includes TCP/IP protocol), an ICMP packet, wherein the ICMP packet carries a value associated with a connection in a connection-oriented transport protocol that identifies a TCP segment that caused a node to identify an error and to generate the ICMP packet in response to the error (Talpade: [0020] lines 4-5 and lines 13-

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15: analyze packet header for packet filtering for ICMP packet based on range of valid values of various packet header fields);

and responding to the ICMP packet by updating a parameter associated with the transport protocol connection only if the packet field value is determined to be valid (Talpad: [0017] lines 27-30: forwarding traffic/updating parameter associated with protocol connection if packet is not DDoS packet/the packet value is valid).

Talpad does not explicitly disclose wherein the portion of the header includes a packet sequence value associated with the connection; obtaining a packet sequence value from the header; determining if the packet sequence value is valid; and responding to the ICMP packet by updating a parameter value associated with the transport protocol connection only if the packet sequence value is determined to be valid.

However, Fan discloses filtering packets based on the sequence number presented in the header portion of a packet and update the current session state if sequence value is valid (Fan: column 10 lines 27-51: using packet values to filter DDoS packets). It would have been obvious to one having ordinary skill in the art to utilize the sequence number contained in the connection-oriented packet into the field value of the ICMP packet because they are analogous art used to control DoS attack. Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant's invention to combine the teachings of Fan within the system of Talpad because it allows packet filter to analyze invalid range of value presented in header for filtering purposes.

Talpad as modified does not explicitly disclose updating MTU value associated with the TCP connection. However, Talpad discloses forwarding traffic if the packet value is valid

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(Talpad: [0017] lines 27-30) and it would have obvious to one having ordinary skill in the art to take different measures to allow traffic including, but not limited to, updating MTU value to increase transmission rate to allow traffic.

14. As per claim 11, Talpade as modified discloses the method of claim 10. Talpade as modified further discloses wherein the step of receiving an ICMP packet comprises receiving an ICMP "endpoint unreachable" error packet (Talpad: [0006]: error packets in denial of service attack).

15. As per claim 12, Talpade as modified discloses the method of claim 10. Talpade as modified further discloses wherein the step of receiving an ICMP packet comprises receiving an ICMP packet that specifies that fragmentation is needed (Talpad: [0020] lines 4-6: ICMP messages).

16. As per claim 13, Talpade as modified discloses the method of claim 10. Talpade as modified further discloses wherein the step of authenticating the ICMP packet by determining if the packet sequence value is valid comprises determining if the packet sequence value is within a range of packet sequence values that are allowed by the transport protocol for the connection (Fan: column 10 lines 27-51).

17. As per claim 14, Talpade as modified discloses the method of claim 10. Talpade as modified further discloses wherein the step of authenticating the ICMP packet by determining if



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the packet sequence value is valid comprises determining if the packet sequence value is within a range of sent but unacknowledged TCP packet sequence values for the connection (Fan: column 10 lines 27-51).

18. As per claim 15, Talpade as modified discloses the method of claim 10. Talpade as modified further discloses wherein the step of authenticating the ICMP packet by determining if the packet sequence value is valid comprises determining if the packet sequence value is exactly equal to one or more sequence values of one or more packets that are then-currently stored in a TCP re-transmission buffer, starting at a sequence value of a previously sent segment that resulted in receiving the ICMP packet (Fan: column 10 lines 35-41).

19. As per claim 16, Talpade as modified discloses the method of claim 10. Talpade as modified further discloses wherein the steps are performed in a router acting as a TCP endpoint node (Talpade: [0020]: sensor/firewall).

20. As per claim 17, Talpade as modified discloses the method of claim 10. Talpade as modified further discloses wherein the steps are performed in a firewall device (Talpade: [0020]: packet filtering device/firewall; Fan: column 10 lines 27-51: firewall/packet filter).

21. As per claim 18, Talpade discloses a computer-readable medium that is selected from a group consisting of non-volatile, and volatile media, carrying one or more sequences of

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instruction, which instructions, when executed by one or more processors, cause the one or more processors to perform the steps of:

receiving an ICMP packet, wherein the ICMP packet carries a value associated with a connection in a connection-oriented transport protocol that identifies a transport protocol segment that caused a node to identify an error and to generate the ICMP packet in response to the error (Talpad: [0020] lines 4-5 and lines 13-15: analyze packet header for packet filtering for ICMP packet based on range of valid values of various packet header fields);

and responding to the ICMP packet by updating a parameter associated with the transport protocol connection only if the packet field value is determined to be valid (Talpad: [0017] lines 27-30: forwarding traffic/updating parameter associated with protocol connection if packet is not DDoS packet/the packet value is valid).

Talpad does not explicitly disclose wherein the portion of the header includes a packet sequence value associated with the connection; obtaining a packet sequence value from the header; determining if the packet sequence value is valid; and responding to the ICMP packet by updating a parameter value associated with the transport protocol connection only if the packet sequence value is determined to be valid.

However, Fan discloses filtering packets based on the sequence number presented in the header portion of a packet and update the current session state if sequence value is valid (Fan: column 10 lines 27-51: using packet values to filter DDoS packets). It would have been obvious to one having ordinary skill in the art to utilize the sequence number contained in the connection-oriented packet into the field value of the ICMP packet because they are analogous art used to control DoS attack. Therefore, it would have been obvious to one having ordinary skill in the art

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at the time of applicant's invention to combine the teachings of Fan within the system of Talpade because it allows packet filter to analyze invalid range of value presented in header for filtering purposes.

22. As per claim 19, Talpade discloses an apparatus for preventing an attack on a network, comprising:

means for receiving an ICMP packet, wherein the ICMP packet carries a value associated with a connection in a connection-oriented transport protocol that identifies a transport protocol segment that caused a node to identify an error and to generate the ICMP packet in response to the error (Talpade: [0020] lines 4-5 and lines 13-15: analyze packet header for packet filtering for ICMP packet based on range of valid values of various packet header fields);

and means for responding to the ICMP packet by updating a parameter associated with the transport protocol connection only if the packet filed value is determined to be valid (Talpad: [0017] lines 27-30: forwarding traffic/updating parameter associated with protocol connection if packet is not DDoS packet/the packet value is valid).

Talpade does not explicitly disclose wherein the portion of the header carries a packet sequence value associated with the connection; means for obtaining a packet sequence value from the header; means for determining if the packet sequence value is valid; and responding to the ICMP packet by updating a parameter value associated with the transport protocol connection only if the packet sequence value is determined to be valid.

However, Fan discloses filtering packets based on the sequence number presented in the header portion of a packet and update the current session state if sequence value is valid (Fan:

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column 10 lines 27-51: using packet values to filter DDoS packets). It would have been obvious to one having ordinary skill in the art to utilize the sequence number contained in the connection-oriented packet into the field value of the ICMP packet because they are analogous art used to control DoS attack. Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant's invention to combine the teachings of Fan within the system of Talpade because it allows packet filter to analyze invalid range of value presented in header for filtering purposes.

23. As per claim 20, Talpade as modified discloses the apparatus of claim 19. Talpade as modified further discloses wherein the step of receiving an ICMP packet comprises receiving an ICMP packet that includes a copy of a TCP header associated with a TCP connection (Fan: column 10 lines 27-51). Same rationale applies here as above in rejecting claim 1.

24. As per claim 21, Talpade as modified discloses the apparatus of claim 19. Talpade as modified further discloses wherein the step of receiving an ICMP packet comprises receiving an ICMP "endpoint unreachable" error packet (Talpade: [0006]: error packets in denial of service attack).

25. As per claim 22, Talpade as modified discloses the apparatus of claim 19. Talpade as modified further discloses wherein the step of receiving an ICMP packet comprises receiving an ICMP packet that specifies that fragmentation is needed (Talpade: [0020] lines 4-6: ICMP messages).

26. As per claim 23, Talpade as modified discloses the apparatus of claim 19. Talpade as modified further discloses wherein the step of authenticating the ICMP packet by determining if the packet sequence value is valid comprises determining if the packet sequence value is within a range of packet sequence values that are allowed by the transport protocol for the connection (Fan: column 10 lines 27-51).

27. As per claim 24, Talpade as modified discloses the apparatus of claim 19. Talpade as modified further discloses wherein the step of authenticating the ICMP packet by determining if the packet sequence value is valid comprises determining if the packet sequence value is within a range of sent but unacknowledged TCP packet sequence values for the connection (Fan: column 10 lines 27-51).

28. As per claim 25, Talpade as modified discloses the apparatus of claim 19. Talpade as modified further discloses wherein the step of authenticating the ICMP packet by determining if the packet sequence value is valid comprises determining if the packet sequence value is exactly equal to one or more sequence values of one or more packets that are then-currently stored in a TCP re-transmission buffer, starting at a sequence value of a previously sent segment that resulted in receiving the ICMP packet (Fan: column 10 lines 35-41).

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29. As per claim 26, Talpade as modified discloses the apparatus of claim 19. Talpade as modified further discloses wherein the steps are performed in a router acting as a TCP endpoint node (Talpade: [0020]: sensor/firewall).

30. As per claim 27, Talpade as modified discloses the apparatus of claim 19. Talpade as modified further discloses wherein the steps are performed in a firewall device (Talpade: [0020]: packet filtering device/firewall; Fan: column 10 lines 27-51: firewall/packet filter).

31. As per claim 28, Talpade discloses a network element, comprising:

- a network interface that is coupled to a data network for receiving one or more packet flows therefrom (Talpade: figure 2: filter router 230);
- a processor (Talpade: figure 2: filter router 230 contains processor);
- on or more stored sequence s of instruction which, when executed by the processor, cause the processor to perform the steps of:
  - receiving an ICMP packet, wherein the ICMP packet carries a value associated with a connection in a connection-oriented transport protocol that identifies a transport protocol segment that caused a node to identify an error and to generate the ICMP packet in response to the error (Talpade: [0020] lines 4-5 and lines 13-15: analyze packet header for packet filtering for ICMP packet based on range of valid values of various packet header fields);
  - responding to the ICMP packet by updating a parameter associated with the transport protocol connection only if the packet filed value is determined to be valid (Talpade: [0017] lines

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27-30: forwarding traffic/updating parameter associated with protocol connection if packet is not DDoS packet/the packet value is valid).

Talpade does not explicitly disclose wherein the portion of the header includes a packet sequence value associated with the connection; means for obtaining a packet sequence value from the header; means for determining if the packet sequence value is valid; and responding to the ICMP packet by updating a parameter value associated with the transport protocol connection only if the packet sequence value is determined to be valid.

However, Fan discloses filtering packets based on the sequence number presented in the header portion of a packet and update the current session state if sequence value is valid (Fan: column 10 lines 27-51: using packet values to filter DDoS packets). It would have been obvious to one having ordinary skill in the art to utilize the sequence number contained in the connection-oriented packet into the field value of the ICMP packet because they are analogous art used to control DoS attack. Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant's invention to combine the teachings of Fan within the system of Talpade because it allows packet filter to analyze invalid range of value presented in header for filtering purposes.

32. As per claim 29, Talpade as modified discloses the network element of claim 28. Talpade as modified further discloses wherein the step of receiving an ICMP packet comprises receiving an ICMP packet that includes a copy of a TCP header associated with a TCP connection (Fan: column 10 lines 27-51). Same rationale applies here as above in rejecting claim 1.

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33. As per claim 30, Talpade as modified discloses the network element of claim 28. Talpade as modified further discloses wherein the step of receiving an ICMP packet comprises receiving an ICMP "endpoint unreachable" error packet (Talpade: [0006]: error packets in denial of service attack).

34. As per claim 31, Talpade as modified discloses the network element of claim 28. Talpade as modified further discloses wherein the step of receiving an ICMP packet comprises receiving an ICMP packet that specifies that fragmentation is needed (Talpade: [0020] lines 4-6: ICMP messages).

35. As per claim 32, Talpade as modified discloses the network element of claim 28. Talpade as modified further discloses wherein the step of authenticating the ICMP packet by determining if the packet sequence value is valid comprises determining if the packet sequence value is within a range of packet sequence values that are allowed by the transport protocol for the connection (Fan: column 10 lines 27-51).

36. As per claim 33, Talpade as modified discloses the network element of claim 28. Talpade as modified further discloses wherein the step of authenticating the ICMP packet by determining if the packet sequence value is valid comprises determining if the packet sequence value is within a range of sent but unacknowledged TCP packet sequence values for the connection (Fan: column 10 lines 27-51).



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37. As per claim 34, Talpade as modified discloses the network element of claim 28. Talpade as modified further discloses wherein the step of authenticating the ICMP packet by determining if the packet sequence value is valid comprises determining if the packet sequence value is exactly equal to one or more sequence values of one or more packets that are then-currently stored in a TCP re-transmission buffer, starting at a sequence value of a previously sent segment that resulted in receiving the ICMP packet (Fan: column 10 lines 35-41).

38. As per claim 35, Talpade as modified discloses the network element of claim 28. Talpade as modified further discloses wherein the steps are performed in a router acting as a TCP endpoint node (Talpade: [0020]: sensor/firewall).

39. As per claim 36, Talpade as modified discloses the network element of claim 28. Talpade as modified further discloses wherein the steps are performed in a firewall device (Talpade: [0020]: packet filtering device/firewall; Fan: column 10 lines 27-51: firewall/packet filter).

### ***Response to Arguments***

40. Applicant's arguments filed on 2/10/09 have been fully considered but they are not persuasive.

Regarding applicant's remarks, applicant mainly argues that the prior art of record does not disclose a sequence value that is used to by a node to identify error and generate ICMP packet in response to that value. However, the examiner disagrees. Talpade discloses that using a range value to filter packet and if the value is within certain range (Talpade: [0020]). The

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filtering function allows nodes to communicate to each other through ICMP to determine whether the packets could be communicated or to prevent DoS attack. It would have been obvious to one having ordinary skill in the art to apply the sequence value of typical transport protocol packet within the ICMP packet to prevent denial of service attack and generate error message if the packet is not deliverable. Therefore, applicant's argument is traversed in light of above explanation.

### ***Conclusion***

41. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHIN-HON CHEN whose telephone number is (571)272-3789. The examiner can normally be reached on Monday through Friday 8:30am to 5:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William R. Korzuch can be reached on (571) 272-7589. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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